ADEQ Arizona Department of Environmental Quality

DRAFT FACT SHEET

Aquifer Protection Permit P-100329
LTF 66064
SIGNIFICANT AMENDMENT
Pinto Valley Mine

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an amended area-wide Aquifer Protection Permit (APP) for the subject facility that covers the life of the facility, including operational, closure, and post closure periods unless suspended or revoked pursuant to Arizona Administrative Code (A.A.C.) R18-9-A213. This Fact Sheet gives pertinent information concerning the issuance of this permit. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: (1) meet Aquifer Water Quality Standards (AWQS) at the Point of Compliance (POC); and (2) demonstrate Best Available Demonstrated Control Technology (BADCT). BADCT's purpose is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., the local subsurface geology), to prevent pollutants from reaching the aquifer or reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer.

I. FACILITY INFORMATION

Name and Location

Permittee's Name:	Pinto Valley Mining Corp.
Mailing Address:	P. O. Box 100 Miami, AZ 85539-0100
Facility Name and Location:	Pinto Valley Mine 2911 N. Forest Service Road 287 Miami, AZ 85539

Amendment Description

ADEQ has reviewed and approved the following changes under this amendment:

- Modify the permitted Main Dump design to accommodate additional waste rock.
- Add the North Barn Marginal Dump, a new discharging facility for storage of waste rock which was previously approved, then subsequently removed from the APP.
- Include BADCT description for the Road Crossing Pond, a lined non-stormwater pond.
- Update the facility closure strategy for the North Barn Marginal Dump, and Road Crossing Pond.
- Evaluate passive containment capture zone (PCCZ) demonstration.
- Update site-wide closure and post-closure costs.
- Update demonstration of financial capabilities.
- Pinto Valley Mine submitted a demonstration of inertness for a limestone stockpile. This facility was determined to be inert and not an APP discharging facility.

Regulatory Status

The following APP-related documents, permits and approvals are associated with the Pinto Valley Mine (PVM):

1. Notice of Disposal (NOD) submitted to ADHS in January 1985 and revised in October 1988 for Magma Copper. These NODs were non-transferable during property transactions. Pinto Valley Operations (PVO) were acquired by BHP in 1995;
2. Temporary APP in August of 1994 for the Gold Gulch 1A Pregnant Leach Solution (PLS) Impoundment, also issued by ADEQ to Magma Copper then transferred to BHP;
3. Area-wide APP was issued in September of 1996 (P-100329) for the PVO issued by ADEQ to BHP;
4. A temporary permit issued by ADEQ in January of 1998 for temporary storage of tailings - issued to BHP;
5. An "other" amendment (P-100329) was issued by ADEQ in June of 1999 to BHP covering:
    a. Conversion of the permit format to conform with the numerical numbering system used in place of the legal numbering system;
    b. A modification of alert levels based on calculations from data collected over a 2-year period;
    c. A modification of the list of parameters to be monitored based on a review of data collected over a 2-year period;
6. An "other" amendment was issued by ADEQ in November of 2002 for BHP including a pilot in-pit leach operation and replacement of Section 6.0 General Conditions and Responsibilities to reflect rule changes, new citations and the current APP framework;
7. In September 2006, BHP PVO was granted authorization to discharge under General APP (P-100639) for a vehicle wheel wash for the new Filter Plant and Concentrate Storage Facility This was processed under the expedited permit program with EEC acting as ADEQ's agent;
8. An "other" amendment was issued by ADEQ in December of 2006 for the addition of a new outlet spillway for PLS to flow from Gold Gulch No. 1 PLS Pond and the permit was updated to the APP framework to reflect rules and current citation language;
9. A minor amendment was issued by ADEQ in February of 2007 to correct typographical errors pertaining to columns in monitoring tables that were cut off during the printing of the original permit that was signed by ADEQ WQD Division Director Joan Card.
10. A significant amendment was issued by ADEQ in September of 2011 to add the Wastewater Treatment Plant and Solid Waste Landfill.
11. An "other" amendment was issued on September 17, 2012 to upgrade BADCT for the Gold Gulch 1A PLS Pond.
12. A *Closure and Post Closure Strategy* dated August 13, 2013 was submitted to update closure activities previously performed and estimate future closure and post closure costs.
13. A significant amendment was issued on September 30, 2013 to modify permitted facilities, remove/close permitted facilities, revise selected sections of the permit (such as BADCT descriptions and monitoring and reporting frequencies), and make administrative corrections to the permit.

14. An "other" amendment was issued on October 11, 2013 to transfer ownership to Pinto Valley Mining Corp.
15. An "other" amendment was issued on June 24, 2014 to replace the financial assurance mechanism. The previous Letter of Credit was replaced by a new Performance Surety Bond.
16. A significant amendment was issued on October 9, 2015. The amendment was to add several facilities, and remove the East Dump, a facility that was never constructed; update the design for some facilities; remove action levels for monitored constituents lacking numeric AWQS to conform with other mining APPs; and make administrative changes/ corrections to the permit.
17. A significant amendment was issued on May 19, 2016 to remove the North Dump that was permitted but no longer needed, and include a consolidated waste rock dump (Main Dump) in place of the previously permitted Gold Gulch East and West Dumps and the New Low-Grade Leach Material is in the process of being permitted.
18. A significant amendment was issued on July 25, 2016 to consolidate TSF4 Boundary Dams 1 and 2 to a single North Boundary Dam consolidate Boundary Dams 3 and 4 to a single South Boundary Dam, and update the closure and post-closure cost.
19. An "other" amendment was issued on March 8, 2017 to remove the permitted, but no longer needed, North Barn Marginal Dump (NBMD) as a discharging facility and remove associated closure costs; establish a compliance schedule to submit a closure plan for the Road Crossing Pond; remove all Alert Levels (ALs) for monitoring constituents lacking numeric Aquifer Water Quality Standards (AWQS) for Alert Level Monitoring Location Spring Gulch 1 (also known as MG1-12b); update the site-wide closure and post-closure costs based on removal of the NBMD; change the name of Cottonwood Canyon Reservoir to Cottonwood Reservoir for consistency with the name used by other permits and authorizations; updated alert level and maximum action leakage rate calculations for the Gold Gulch No. 1A PLS Pond as per the compliance schedule item (CSI); and establish a compliance schedule for the demonstration of Passive Containment Capture Zone (PCCZ). Included *2016 Closure and Post Closure Strategy* dated July 14, 2016.
20. A significant amendment was issued on May 3, 2018 to modify life-of-mine design configuration and footprint for Tailings Storage Facility No. 4 (TSF4); remove Saddle Dam as a design component of TSF4; update closure design for TSF4; revise site-wide closure and post-closure cost estimate and update financial assurance demonstration; and change facility names for two facilities (the new names are Rosa's Pond and Yasin Catchment).

A monitoring program is in place to ensure that AWQS will not be exceeded at the POC pursuant to Title 49, Chapter 2, Article 3 of the Arizona Revised Statutes (A.R.S.) and the APP permit terms. It is described in greater detail later in this fact sheet. To ensure compliance with AWQS, the permit requires the permittee to monitor downgradient groundwater quality at POCs located at the edge of the area-wide APP Pollutant Management Area (PMA).

Facility Description

Mining at the Pinto Valley Mining District began in 1874. In the recent history, the site was owned and operated by Magma Copper and was purchased by Broken Hill Proprietary Company Ltd (BHP) in January 1996. In April 2013, BHP entered into a purchase agreement with Pinto Valley

Mining Corp. to transfer ownership of the Pinto Valley Mine to Pinto Valley Mining Corp. (PVMC), a subsidiary of Capstone Mining Corp. Ownership transferred toPVMC on October 11, 2013.

Under the current APP, PVMC is authorized to operate ore crushing and concentrating operations, dump leaching, solvent extraction and electrowinning (SX/EW) operations, tailings storage facilities, waste dumps, process solution ponds, stormwater runoff ponds, process pipelines, and ancillary maintenance and operation facilities such as a wastewater treatment plant and solid waste landfill. PVMC mines low-grade copper and molybdenum ore, including millable and leach-grade ore. The millable ore is crushed and concentrated on-site. Copper and molybdenum concentrates are shipped off-site for smelting and refining. Low-grade ore is deposited on the Low-grade Ore Leaching Piles in the dump leaching area known as Gold Gulch. Raffinate solutions consisting of weak sulfuric acid are sprayed over the low-grade ore and the resulting PLS is collected in a double lined facility with a leak collection and recovery system. The solution is pumped to the SX/EW plant to produce copper cathodes. In February 1998, mining at the PVM was curtailed, leaving the Low-grade Ore leaching Piles and SX/EW as the only active operations. Mining operations resumed in April 2007, were curtailed in January 2009, and again resumed in December 2012.

Geology

The Pinto Valley deposit is located within the Inspiration structural block. Geologic units ranging in age from Precambrian to Quaternary outcrop in the area. The geologic setting is a Precambrian crystalline basement complex of nested intermediate plutons intruding an older basement schist complex and in turn engulfed by the regional Ruin Granite batholithic complex. This suite, in turn, is cut by the widespread Schultze Granite of Laramide Age. The area was uplifted in the Tertiary, and covered with a thick sequence of deposits, including the Whitetail Conglomerate, Apache Leap Tuff, and Gila Conglomerate. Unconsolidated alluvium occurs along Pinto Creek and some of its tributaries.

The predominant geologic structure is the north-northwest trending quartz monzonite horst block of Porphyry Mountain (the Castle Dome horst block). The Castle Dome horst block is bounded by the north-northwest trending West Branch Gold Gulch Fault to the west and Jewel Hill Fault to the east.

Hydrogeology

Groundwater occurs in two hydrogeologic units, including a surficial, shallow groundwater system present in the alluvium and upper weathered portions of underlying bedrock, and more laterally extensive, discontinuous, deep groundwater system within joints and fractures in the consolidated bedrock. Alluvium is present in major and minor stream channels and drainages. Bedrock is present through the mine and underlies the alluvium. Regional groundwater flows to the north-northwest. Local groundwater flows to the open pit, which acts as a hydrologic sink.

Upward vertical gradients and seeps/springs are present in some areas of the site. Abandoned wells CDX-6, CDX-7, CDX-11 previously located along the southwest side of the Low-grade Ore Leaching Piles flowed at the groundwater surface (artesian) at ranges of 80 to 100 gallons per minute (gpm) prior to abandonment (Hargis, 1995). Upward gradients were used as a part of site characteristics in support of BADCT for the Low-grade Ore Leaching Piles.

Although there is a bedrock aquifer, bedrock at the site exhibits low hydraulic conductivity. Results of testing performed at the site indicate that conductivity ranges from 1.1×10^{-7} to 1.1×10^{-3} centimeters per second (cm/sec). These findings were used in support of BADCT for several APP-regulated facilities that were constructed pre-APP (before 1986).

II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY

The PVM relies on engineered controls, operational procedures, and for pre-1986 facilities, water conservation/beneficial use and site characteristics to demonstrate BADCT. BADCT also includes stormwater diversion to protect APP facilities, and stormwater management for the 100–year, 24-hour storm event or the maximum saturation event (MSE).

All APP regulated facilities have been evaluated for compliance with the requirements of A.R.S. § 49-243 and A.A.C. R18-9-A202, and have been determined to meet those requirements.

For this amendment, a tailings booster pump station and a single-lined pond (Fuller Pond) located on top of the TSF2 were added to the description of TSF2. The pond is not considered a separate individual APP facility. The pond, lined with 80-mil HDPE, is located on a wide bench of TSF2 about 400 feet from the crest of the tailings embankment slope separating TSF2 from TSF3. The pond was constructed from the original grade of about 3,850 feet to a crest elevation of 3,856 feet. The pond is irregular in plan dimension, having an average width and breadth of about 180 feet by 240 feet, and a depth of 16 feet. The interior slopes of the pond are 3H:1V. A reinforced concrete ramp is provided for cleaning up sediments. The pond is used for temporary storage of tailings that have been collected within the contained area of the pump station and for draindown of the TSF4 tailings distribution line. A stability analysis was conducted which revealed that there would be no impact to the stability of either TSF2 or TSF3 caused by the construction of the tailings booster pump station pond.

For many of the facilities, site characteristics were considered as part of BADCT.

Inspections and operational monitoring is required to ensure that facilities are maintained in accordance with BADCT and standard engineering practices.

Passive Containment Capture Zone

Based on supporting documentation provided in the Application, the permittee has satisfactorily predicted that the PVM Open-Pit will create a "passive containment capture zone," as per A.R.S. § 49-243(G). Passive containment, per A.R.S. § 49-243(G)(1), means natural or engineered topographical, geological or hydrological control measures that can operate without continuous maintenance. Monitoring and inspections to confirm performance of the passive containment do not constitute maintenance.

A post-audit of the approved groundwater flow model shall be conducted every five (5) years in accordance with Compliance Schedule Item No. 1 and Section 2.7.5. Factors to be

evaluated in the post-audit include groundwater inflow, the estimated static water level in the pits, the estimated time to reach static water level, and any potential for the water level in the pit to rise to an elevation where the hydraulic gradient reverses and the pit ceases to function as a passive containment. The passive containment modeling projections shall be based solely on natural or engineered topographical, geological, or hydrological control measures that can operate without continuous maintenance (A.R.S. § 49-243(G)(1).

Every five (5) years thereafter, the permittee shall compare the current groundwater data to the previous model predictions. The assumptions about mine development and infiltration shall be reviewed in terms of the actual changes in the pit configuration, leaching areas, leach rates, sump locations, water balance, annual precipitation and storm events. The resulting compilation shall be compared to predictions provided by the groundwater flow model for the previous calibration period.

Based upon the updated groundwater model submitted in the amendment application, the following facilities are located 100 percent within the calculated hydraulic sink: the Road Crossing Pond, Northside Dump 9.1, Northside Dump 9.3, Southside Dump 13, 19.1 Dump, North Barn Marginal Dump, and the Solid Waste Landfill.

The following facilities are partially located within the calculated hydraulic sink:

- Castle Dome Marginal Dump (92 percent)
- Southside Dump (61 percent)
- Main Dump (57 percent)
- Low-grade Ore Leaching Piles (55 percent)
- Tailing Storage Facility No. 1 and Tailings Storage Facility No. 2 (46 percent)

III. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

Monitoring and Reporting Requirements

For this permit, an area-wide PMA has been designated. Pursuant to A.R.S § 49-244 (1), a PMA is the limit projected (onto the ground surface) in the horizontal plane of the area on which pollutants are or will be placed. The PMA is shown on Figure 1. The PMA includes horizontal space taken up by any liner, dike or other barrier designed to contain pollutants for all APP regulated facilities. An area-wide PMA is a line circumscribing the APP-regulated facilities. Compliance with AWQS is determined at the edge of the PMA. For this permit, a perimeter monitoring program has been put in place to monitor groundwater in the downgradient direction and protect off-site water uses.

Facility POCs are located at the northern, western and southwestern boundaries of the PMA. No wells are currently located on the eastern property boundary based on direction of groundwater flow, which is generally towards the northwest in the northern portion of the site and southwest in the southern portion of the site.

The permit requires that all monitoring be conducted pursuant to Sections 2.0 and 4.0. A total of 11 hazardous and non-hazardous POCs have been designed for this permit, these include both groundwater monitoring wells and groundwater spring monitoring locations.

The 11 hazardous and non-hazardous POCs listed in Table 4.2-1, Section 4.2 of the permit, will be monitored on a quarterly basis according to the compliance groundwater monitoring requirements in Tables 4.2-2 through 4.2-13 in Section 4.2. Once every 2 years (biennially), the permittee will sample the POC wells for the original analyte list in Tables 2 thorough 12, Section 4.2.

Liner Leakage Monitoring

The leak collection and recovery system (LCRS) for the PLS impoundments in Gold Gulch will be monitored according to Table 4.1-1, Section 4.1. The contingency plan included in Section 2.6.2.2 & 2.6.2.3 will be activated if monitoring shows that alert levels (ALs) for the LCRS are exceeded.

APP Facility Inspections and Operational Monitoring for Performance Standards

Inspection and operational requirements are included in Table 4.1-4, Section 4.1 for stormwater and process water retention ponds, caisson and seepage collection systems, tailings storage facilities, waste rock dumps, stormwater diversion ditches, monitoring wells, barge pumps, WWTP and the Solid Waste Landfill.

Wastewater Treatment Plant

Initial discharge characterization monitoring was completed for metals, volatile organic and semi-volatile organic compounds. Routine discharge monitoring is required for flow, pathogens and nitrogen. A concentration limit of fecal coliform organisms in 4 of the 7 wastewater samples collected during the week is less than 200 CFU/100 ml and less than a single sample maximum of 800 CFU/100 ml. Table 4.3-1 in the APP includes routine WWTP monitoring requirements.

The WWTP effluent sampling point will be at a point on the effluent line downstream from the chlorination tank, Latitude: 33° 23’ 17” N, Longitude: 110° 58’ 24” W.

Points of Compliance

The following table lists the hazardous and nonhazardous POC groundwater monitoring locations.

Sampling Point Number	Identifier	ADWR Number	Latitude	Longitude	Facility Monitoring
HAZARDOUS AND NONHAZARDOUS POINTS OF COMPLIANCE					
GROUNDWATER POC MONITORING LOCATIONS					
019	APP-1A	55-543407	33° 27' 25" N	110° 58' 43" W	Tailings Storage Facility No. 4, above fault zone
020	APP-1Br	55-563251	33° 27' 25" N	110° 58' 43" W	Tailings Storage Facility No. 4, below fault zone
021	APP-2	55-543406	33° 27' 16" N	110° 59' 46" W	Tailings Storage Facility No. 4, East Water Canyon
022	APP-3A	55-543404	33° 25' 34" N	110° 59' 59" W	Gold Gulch

Sampling Point Number	Identifier	ADWR Number	Latitude	Longitude	Facility Monitoring
023	APP-3B	55-543405	33° 25' 34" N	110° 59' 59" W	Gold Gulch
024	APP-4	55-543403	33° 25' 21" N	111° 00' 03" W	Tailings Storage Facility No. 3
025	APP-5A	55-543402	33° 23' 42" N	110° 59' 07" W	No. 1 Seepage
026	APP-5B	55-553712M	33° 23' 42" N	110° 59' 07" W	No. 1 Seepage
027	APP-6	55-543401	33° 23' 36" N	110° 58' 57" W	Miller Gulch
SPRING POC MONITORING LOCATIONS					
033	North Draw 1	N/A[1]	33° 25' 38" N	111° 00' 00" W	Baker Pond and North Dump
036	MG1-6b/ Homestead Springs	N/A	33° 24' 54" N	111° 00' 05" W	Tailings Storage Facility No. 3
ALERT LOCATION – GROUNDWATER/SEEP/SPRING MONITORING					
032	APP-7 (Ground-water well)	55-560644	33° 22' 58" N	110° 59' 25" W	Gold Gulch
035	MG1-12b/ Spring Gold Gulch 1	N/A	33° 25' 31" N	110° 59' 43" W	Gold Gulch
034	MG1-7a/ Raffinate Pond Monitor Point (seep)	N/A	33° 23' 33" N	110° 59' 17" W	Raffinate Pond

IV. STORMWATER and SURFACE WATER CONSIDERATIONS

The nearest surface water body is Pinto Creek. Pinto Creek is protected by a series of catchments and impoundments at PVM that are designed to capture impacted stormwater and runoff. The stormwater retention facilities are designed to contain runoff from a 100-year, 24-hour storm or the MSE (which is more conservative than the 100-year, 24-hour event) as a part of BADCT. Stormwater diversion structures in place at the site also divert stormwater around key APP-discharging facilities, as a part of BADCT. Pumping equipment and backup power sources are maintained where necessary to control stormwater runoff and recycle it to the process water control system. Stormwater and surface water facilities will be inspected for the duration of the permit to ensure that discharge control components are not impacted by surface water.

V. COMPLIANCE SCHEDULE

The Compliance Schedule is provided in Section 3.0 of the permit.

VI. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT

Technical Capability

The permittee has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B).

[1] N/A = not applicable

ADEQ requires that appropriate documents be sealed by an Arizona-registered Geologist or Professional Engineer. This requirement is a part of an ongoing demonstration of technical capability. The permittee is expected to maintain technical capability throughout the life of the facility.

Financial Capability

The estimated closure cost is $99,510,030, and the post-closure cost is $3,356,618, for a total of $102,866,648. Pursuant to A.A.C. R18-9-A203.C.2, the current financial assurance mechanism is demonstrated through an Increase Rider to previously submitted Performance Surety Bond totaling $102,866,648.

Zoning Requirements

Mining activity of greater than five contiguous acres is exempt from zoning requirements pursuant to A.R.S. § 11-812 and A.R.S. § 27-301.

VII. ADMINISTRATIVE INFORMATION

Public Notice (A.A.C. R18-9-108(A))

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit.

Public Comment Period (A.A.C. R18-9-109(A))

The Department shall accept written comments from the public prior to granting the significant amendment. The written public comment period begins on the publication date of the public notice and extends for 30 calendar days. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

Public Hearing (A.A.C R18-9-109(B))

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

VIII. ADDITIONAL INFORMATION

Additional information relating to this proposed permit may be obtained from:

Arizona Department of Environmental Quality
Water Quality Division – Groundwater Protection Value Stream
Attn: Vimal Chauhan
1110 W. Washington St., Mail Code 5415B-3
Phoenix, Arizona 85007
Phone: (602) 771-4362